REMARKS

The Examiner objected to claims 4, 15, and 20. Claims 4 and 20 have been amended for clarity. Claim 15 recites specific beamforming parameters, so further limits claim 13. Other beamforming parameters may exist, such as polarity or resolution of the profiles during dynamic receive operation.

In the Office Action, the Examiner rejected claims 1, 2, 6, 13 and 14 pursuant to 35 U.S.C. §102(b) as anticipated by Hall, et al. (U.S. Patent No.6,071,240). Claims 3-5, 7-12, and 15-29 were rejected pursuant to 35 U.S.C. §103(a) as unpatentable over Hall, et al. in view of Ustuner, et al. (U.S. Patent No. 6,432,054). Claims 30-34 were rejected pursuant to 35 U.S.C. §103(a) as unpatentable over Hall, et al. in view of Ustuner, et al. and further in view of Rigby (U.S. Patent No. 5,910,115). Applicants respectfully request reconsideration of the rejections of claims 1-34, including independent claims 1, 13, 16, 27, 30 and 34.

Independent claim 1 recites obtaining data from a plurality of transducer elements across a receive aperture, determining a coherence factor as a function of the data across the receive aperture, and setting a beamforming parameter as a function of the coherence factor.

Hall, et al. do not disclose these limitations. Hall, et al. suppress incoherent data (abstract; and col. 2, lines 25-39). Different delays are applied in the receive beamformer to create coherent and incoherent sums (col. 2, lines 62-67; and col. 6, lines 46-60). The coherent and incoherent sums are then compared (col. 3, lines 1-2; and col. 6, line 61-col. 7, line 1). A suppression signal is output based on the comparison (col. 3, lines 2-10; and col. 7, lines 1-13). The amplitude of the displayed signal is adjusted based on the coherence comparison (col. 3, lines 5-18; col. 7, lines 30-32; and col. 9, lines 1-8). Hall, et al. use different delays to determine coherence, but only adjust signal amplitude (e.g. suppress) based on the coherence. Hall, et al. do not set a beamformer parameter as a function of the coherence factor.

In reply, the Examiner notes that Hall, et al. adjusts signal amplitude at col. 8, lines 55 - col. 9, line 5, and alleges that the signal amplitude is a beamforming parameter. However, the signal amplitude of Hall, et al. at cols. 8 and 9 is not a beamforming parameter. For beamforming, signals from different elements or receive channels are summed and output to a detector (col. 7, lines 30-60). The detector operates on already beamformed data to generate

image signals (col. 7, line 61 - col. 8, line 1). The amplitude of this intensity or amplitude image is altered based on the coherence factor (col. 8, line 55 - col. 9, line 5). The amplitude of the receive beamformed data is altered (col. 9, lines 1-5). Hall, et al. alter already beamformed signal amplitude, not a parameter for beamforming.

Independent claim 13 recites a beamformer parameter responsive to the coherence factor. Claim 13 is allowable for similar reasons as claim 1.

Independent claim 16 recites setting an image forming parameter as a function of the coherence factor, the image forming parameter being for synthesis, multibeam, a number of sequential beams, a number of sub-apertures, a number of focal zones or combinations thereof.

As noted above, Hall, et al. suppress or change the amplitude based on the coherent and incoherent sum comparison. The coherent sum, incoherent sum, or a combination of both may be used for the image. As noted by the Examiner, Hall, et al. do not disclose the image forming parameters of claim 16 being a function of the coherence factor.

Ustuner, et al., like Hall, et al., do not disclose setting an image forming parameter for synthesis, multibeam, a number of sequential beams, a number of subapertures, a number of focal zones, or combinations thereof. Ustuner, et al. form a compound signal and a synthesized signal (col. 5, lines 31-35). The compound and synthesized signals are relatively weighted and then summed (col. 5, lines 41-45 and 50-55). The weights are selected as a function of a coherence factor (col. 5, lines 36-41). Ustuner, et al. weight compounded and synthesized signals as a function of coherence. The relative weights are not a parameter for synthesis, multibeam, a number of sequential beams, a number of subapertures, nor a number of focal zones.

The Examiner alleges Ustuner, et al. show setting beams and focal zones. Ustuner provide two beams to form the compound and synthesized signals (col. 2, lines 19-36). These beams are formed with a transmit focus (col. 2, lines 11-16) and dynamic focus on receive (col. 2, lines 19-22). This beamforming is not done as a function of the coherence factor. Ustuner, et al. weight the compound and synthesized signal contribution based on the coherence, not the focal zone, number of beams or multibeam.

Ustuner, et al. weight synthesized signals as a function of the coherence factor. The weight is not a parameter for synthesis. The synthesis has already occurred.

Independent claim 27 is allowable for similar reasons as claim 16.

Independent claim 30 recites setting dynamic range, a nonlinear filter, or a nonlinear map as a function of the coherence factor. As noted by the Examiner, Hall, et al. and Ustuner, et al. do not set these parameters as a function of the coherence factor.

Rigby, like Hall, et al., does not disclose these limitations. Hall, et al. is a CIP of Rigby and generally includes the same information cited in Rigby. Since Hall, et al. do not disclose these limitations, the parent patent Rigby does not.

The cited portion (col. 5, line 26 - col. 6, line 15) of Rigby discloses mapping the coherence factor (see col. 5, lines 39-47 in particular). The mapping outputs a value for a display pixel based on an input coherence factor. Rigby and Hall, et al. use a map to map coherence factor, but do not set the map as a function of the coherence factor. One of different maps and dynamic range are not set based on coherence factor. Rigby does not disclose the limitations of claim 30.

Independent claim 34 is allowable for the same reasons as discussed above for claim 30.

Dependent claims 2-12, 14-15, 17-26, 28, and 31-33 depend from one of the independent claims discussed above, so are allowable for the same reasons. Further limitations distinguish from Ustuner, et al.

Claims 3 and 19 recite calculating phase variance across transducer elements. Hall, et al. use beam sum to determine coherence, and do not calculate phase variance. Col. 6 shows beamforming and col. 7 shows using coherent data, which has phase information. Neither shows calculating phase variance. Ustuner, et al. do not disclose how to determine the coherence factor.

Claims 5-10, 12, 15, 17, 21-26, and 31-33 all recite specific parameters set as a function of the coherence factor. Hall, et al., Ustuner, et al. and Rigby may use some of these parameters in general, but do not set them as a function of the coherence factor. Hall, et al. and Rigby teach a feed-forward system that changes amplitude or not based on coherence. Ustuner, et al. sets a mixing weight based on coherence.

Claim 11 is allowable for the same reason as claim 16.

CONCLUSION

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof. If for any reason, the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, he is respectfully requested to call Craig Summerfield at (312) 321-4726.

PLEASE MAIL CORRESPONDENCE TO:

Siemens Corporation
Customer No. 28524
Attn: Elsa Keller, Legal Administrator
170 Wood Avenue South
Iselin, NJ 08830

Respectfully submitted,

Rosa S. Kim, Reg. No. 39,728
Attorney(s) for Applicant(s)
Telephone: 650-694-5330
Date: 8-22-08